

5. The apparatus according to claim 4 wherein the sample identification means produces a signal to the controller when the sample identification indicator

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is detected and the controller in turn stops the container at a predetermined position so that the window is before the analyser.

6. The apparatus according to claim 2 wherein the sample identification means is a bar code scanner and the sample identification indicator is a bar coded label fixed to the container.

7. The apparatus according to claim 1 wherein the apparatus comprises processing means having a storage device for storing said predetermined characteristic or set of characteristics relating to each container type.

8. The apparatus according to claim 2 wherein the apparatus comprises processing means having a storage device for storing said predetermined characteristic or set of characteristics relating to each container type, and the processing means is arranged to access information relating to analysis prescribed for each sample online from a remote computer or from the storage device.

9. The apparatus according to claim 8 wherein the apparatus utilises the sample information for the determination of whether or not aspiration of the sample in an identified container is required, and if required the volume to be dispensed in one or each secondary container.

10. The apparatus according to claim 8 ~~or 9~~ wherein the apparatus utilises the sample information for the determination of placement for the containers and/or secondary containers in a container distribution station.

11. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers and the containers each containing a sample for pathology analysis, the apparatus comprises a container distributor having a cap removal and replacement means including a container holder movable with respect to a rotatable cap engagement member, in operation a capped container positioned in the holder which is controllably moved towards the cap engagement member, and the cap engagement member having jaw parts arranged to grip onto the cap and rotate the cap as the holder moves relative to the cap engagement member thereby uncapping the container, and for replacement of the cap the holder moves the uncapped container relative to the cap gripped by the jaw parts and the cap engagement and removal means rotates

the jaw members and thereby rotating the cap onto the container as the container is pushed towards the cap.

12. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers and the containers each containing a sample for pathology analysis, the apparatus comprises a container distributor having sample aspiration and/or dispensing means for aspirating and/or dispensing volumetrically a predetermined portion of the sample in or to a container, the sample aspiration and/or dispensing means including a pipette tip holder for holding a plurality of pipette tips, a pipette probe, an articulated arm arranged for removing a pipette tip from the holder and place the pipette tip onto the probe, and a pipette tip removing means arranged to remove the pipette tip from the probe for deposition in a disposal receptacle.

13. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers and the containers each containing a sample for pathology analysis, the apparatus comprises a blockage detection means for detecting blockage of flow in a sample aspiration means including a pipette tip for aspirating volumetrically a predetermined portion of a samples in a container, a pipette tip controller is arranged to move the tip towards the sample in the container, the blockage detection means including a pressure sensitive module having a pump for aspiration of the sample through the tip, the blockage detection means being arranged to detect blockage in the tip and thereby to provide a warning signal and to cause the operation of the sample aspiration means to be arrested until the blockage has been resolved.

14. The apparatus according to claim 13 wherein the apparatus further comprises a sample level detection means which includes a low pressure generating means for applying low pressure to the aspiration means, pressure sensor means for sensing the pressure in the aspiration means and an actuator for moving the tip towards the sample, the sample level is detected when the pressure as sensed by the sensor means exceeds a predetermined margin from said low pressure.

15. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers and the containers each containing a sample for pathology analysis, the apparatus comprises container sealing means

for sealing containers with samples dispensed therein, the container sealing means including a source of heat sensitive laminate tape, means for punching the tape to form a cap for the one of said containers, means for placing said cap over the top of said one container and means for heating the cap over said one container to cause the laminate to seal the container.

16. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers and the containers each containing a sample for pathology analysis, the apparatus comprises automatic labelling means for the application of adhesive labels to containers with samples dispensed therein, the automatic labelling means includes one or more spools of adhesive labels, means to provide sample identification indicators on the adhesive labels, a sample identification means to verify that the indicators on the labels corresponds to the indicators of containers from which the samples are aspirated, and means for detecting errors in the indicators on the labelled containers or the absence of a label.

17. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers for pathology analysis, each container having a closed end and an open end, the apparatus comprises hopper means for receiving and delivering one or more of the containers, and container alignment means arranged for aligning the containers from a substantially horizontal position to a vertical position with the open ends positioned to receive samples when the containers are delivered from said hopper means.

18. The apparatus according to claim 17 wherein the container alignment means includes a rotary magazine having circumferentially located compartments to hold substantially horizontally positioned containers, a sideways plunger member arranged in co-operation with the magazine and a guide positioned beneath the magazine to change the position of the containers released from the magazine from the horizontal to the vertical position, in operation the plunger member pushes a closed end of a container so that the displaced container released from the magazine falls into the guide in the vertical position, said co-operating plunger member when not in contact with a closed end, does not push a container which when released, falls into the guide in the vertical position.

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19. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers and the containers each containing a sample for pathology analysis, the apparatus comprises a loading station having a conveyor arrangement for conveying the containers in position to be loaded onto a tube handling station, the conveyor arrangement including a movable conveyor surface on which carriers for carrying said containers can be placed, the conveyor surface having a first section arranged with a barrier dividing said first section into a buffer zone and a by-pass passage for the carriers, the buffer zone having an entrance and a diversion part is arranged adjacent to the entrance, in operation the diversion part diverts the carriers carrying containers into the buffer zone and empty carriers are allowed to continue to move into the by-pass passage.

20. The apparatus according to claim 19 wherein the diversion part is arranged so that when the buffer zone is full of carriers with tubes, other carriers with or without tubes continue to move into the by-pass passage.

21. The apparatus according to claim 19 wherein the buffer zone has a controllably actuable member positioned opposite to said entrance and the actuable member is controlled to push a carrier out of the buffer zone after the container on said carrier has been loaded onto the handling station or a rejected tube is placed on said carrier in the buffer zone.

22. The apparatus according to claim 19 wherein the conveyor surface having a second section arranged with another barrier dividing said second section into a reject zone for receiving carriers with rejected containers and a by-pass passage for other carriers, the reject zone having a diversion part arranged to divert the carriers carrying rejected containers into the reject zone and to allow empty carriers to continue to move into the by-pass passage.

23. A pathology sample distribution system having a plurality of containers of different types and the containers each containing a sample for pathology analysis a pathology specimen, the system comprises a loading station for loading said containers, a container handling station arranged to receive the containers in turn from the loading station, and distribution station with areas or distribution holders marked for specific analysing processes, the handling station includes one or a combination of two or more of the apparatus as claimed in ^{claim 1} ~~claims 1 to 22~~.

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24. A pathology sample distribution system having a plurality of containers of different types and the containers each containing a sample for pathology analysis.

The system comprises:-

primary container identification means; the identification means including
5 a bar code scanner to scan bar coded labels and an image analyser to analyse one or more characteristics of the container and/or the sample in therein;

primary container cap removal and replacement means;

hopper means having container alignment means for delivering secondary
10 containers each with a closed end and an open end in a vertical position and with the open ends in position to receive samples;

sample aspiration and/or dispensing means for aspirating and/or dispensing volumetrically proportions of the samples from the primary container;

blockage detection means for detecting blockage of flow in the sample
15 aspiration means;

secondary container sealing means;

secondary container labelling means;

secondary container storage means;

container conveyance means;

20 wherein in operation each primary container containing a sample is presented to the identification means and the container is accepted or rejected according to given criteria; the identification means being arranged to reject a container when it fails to detect the given criteria and thereby indicating the presence of an error condition,

25 when the given criteria are detected the cap of the primary container is removed and aliquots of the sample aspirated by the sample aspiration and/or dispensing means are dispensed to the secondary container or containers which are then sealed and labelled and placed in the storage means; and whereby

30 the conveyance of the primary containers and secondary containers between operational steps is via the container conveyance means and the

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whole process is coordinated and controlled by a computerised laboratory information management system.